REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

The Examiner acknowledges the foreign priority claim under 35 U.S.C. §119, but indicates that none of the certified copies of the priority documents has been received. Applicants filed the certified copy of the priority document on February 27, 2001 along with an Information Disclosure Statement. A copy of the postcard receipt acknowledged by the PTO is attached. Acknowledgement of receipt of the certified copy is respectfully requested.

Although the Examiner marks on the PTOL-326 form that an Information Disclosure Statement PTO-1449 is attached to the Office Action, Applicants have carefully reviewed the Office Action and find no initialed PTO-1449 form attached. Applicants request that the initialed PTO-1449 form be provided with the Examiner's next action.

The Abstract of the Disclosure has been amended to delete the reference to Figure 2. Withdrawal of the objection to the Abstract is requested.

Claim 9 stands rejected under 35 U.S.C. §112, second paragraph as allegedly being indefinite because of the recitation "the side-bands." Claim 9 has been amended to overcome this indefiniteness. Withdrawal of the rejection under §112, second paragraph is respectfully requested.

Claims 1, 2, 4, 7-10, 12, and 13 stand rejected under 35 U.S.C. §102 as being anticipated by WO 98/11683 to Hellberg et al. This rejection is respectfully traversed.

To establish that a claim is anticipated, the Examiner must point out where each and every limitation in the claim is found in a single prior art reference. *Scripps Clinic & Research Found. v. Genentec, Inc.*, 927 F.2d 1565 (Fed. Cir. 1991). Every limitation contained in the claims must be present in the reference, and if even one limitation is missing from the reference, then it does not anticipate the claim. *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565 (Fed. Cir. 1986). Hellberg fails to satisfy this rigorous standard.

Hellberg discloses generating a moderately wideband, high power RF signal with high efficiency and linearity. A sigma-delta modulator generates a signal from an information signal followed by digital up-mixing, switching, and bandpath filtering. The switching process provides amplification, and the digitally up-mixed, sigma-delta coded baseband signal determines which switch is closed. As shown in Figure 5, when the RF signal equals a logical one, the RF signal is routed to the laser 5310 which generates an optical signal that energizes a first photoconductive switch 5330 connected to a positive, DC power supply voltage +U. Alternatively, if the RF signal is a logical zero, a laser 5320 is activated to energize photoconductive switch 5340 which is connected to a negative DC power supply voltage –U.

> When the first photoconductive switch 5330 is irradiated with light o_1, its supply voltage +U will be available on said output, whereas when the second photoconductive switch 5340 is a irradiated with light o_2 the supply voltage –U of the

switch will be available on the output instead.

Page 14, lines 12-15. Thus, the voltage-switched information signal P output from the switching unit is a DC voltage, either +U or –U. This can be seen in Figure 9c.

One drawback with Hellberg's system is that the photoconductive switches are not ideal switches, and therefore, achieve an efficiency less than 100 percent. Such switches also have finite transitions times between closed and open states which results in a switching transient problem. In addition, if two switches are simultaneously closed during a switching transient, an almost short-circuited DC power supply would result. Alternatively, if all switches are simultaneously open during a switching transient, the band-pass filter will create a voltage transient which also has negative results. Although transient problems could be reduced by using a faster switch, there is a tradeoff between switching speed, switching conductivity, and required switch control signal power. The present invention solves the problem of switching transients by connecting alternating carrier voltage instead of connecting DC voltages as in Hellberg et al.

The switching events are timed to coincide with the regular time intervals when the AC carrier voltages have a zero voltage value, (or close to zero), to solve the switching transient problem. In this regard, the Examiner's attention is directed to Figures 2 and 3, which show that digital signal S_D is coupled through switches S_1- S_M to control switching-in different carrier signals represented as $v_C(t)$. Figure 4 illustrates a zero crossing of the AC carrier $v_C(t)$ (in Figure 4d) which occurs when both switches SW1 and SW2. This also true for the modified AC carrier signal shown in Figure 4e. By

having the switches SW1 and SW2 closed at the same time for a small time period, the switching transient problem is solved since the carrier signal zero at that switching time.

Accordingly, Hellberg fails to disclose in method claim 1 "generating for each of the discrete signals values a corresponding alternating current (AC) carrier signal." Hellberg's code sequence generator 511 generates a code sequence B which is input to an exclusive-or mixer together with the information signal to form a radio frequency signal at the output. That bit sequence B includes a sequence of zeros and ones. An alternating current (AC) carrier signal describes a signal with alternating and equal positive and negative voltages or current waveforms. An arbitrary bit sequence that may, for example, have several "0's" in a row or several "1's" in a row does not qualify as an alternating current (AC) carrier signal. Similarly, independent claim 14 recites "multiple alternating current (AC) carrier signal generators, one individual AC carrier signal generator provided for and associated with each of the at least two signal values." Hellberg only discloses one code sequence generator, and the code sequence B is not AC carrier signal.

Hellberg also fails to disclose using each digital signal value to control connecting the corresponding AC carrier signal to the output line. As explained on page 14 of Hellberg, beginning at line 12:

> when the photoconductive switch 5330 is irradiated with light o_1, its supply voltage +U will be available on said output, whereas when the second photoconductive switch 5340 is irradiated with light o_2 the supply voltage –U of the switch will be available on the output instead.

Thus, Hellberg's switch outputs a DC voltage and does not connect a corresponding AC carrier signal to the output. Independent claim 14 recites:

> wherein each of the switches is associated with and controlled by one of the digital signal values to connect the AC carrier signal generator associated with the signal value to the output line when the digital signal adopts the respective signal value and to disconnect the AC carrier signal value when the digital signal does not adopt the respective signal value.

Hellberg's switches 5330 and 5340 do not connect an AC carrier signal generator to the output P.

Claims 14, 16, and 17 stand rejected 102(b) as being anticipated by U.S. Patent 5,450,444 to Miki et al. This rejection is respectfully traversed.

Miki discloses a digital AM transmitter that converts an audio signal to a digital audio signal using an analog digital converter 12, the bits of the digital signal are applied to a code unit 13 that has 4095 output terminals. A carrier wave signal C supplied to input terminal 17 is divided into 4095 portions by carrier wave divider 18 and supplied to 4095 carrier wave switches indicated at reference numeral 15. Each carrier wave switch 15 is electrically conductive when the corresponding switch control signal from the code unit 13 is a "1," and nonconductive when the switch control signal is a "0", "thereby selectively receiving divided portions of the carrier wave signal C." Column 1, lines 51-52. The selected carrier wave portions are combined using 495 transformers in combiner 19, sent to a filter 20, and output at reference numeral 21.

Miki discloses only one signal carrier wave signal C that is divided into digital bits in the carrier wave divider with each bit being switched, amplified, and combined into an

AM wave signal. Miki fails to disclose "multiple alternating current (AC) signal generators, one individual AC carrier signal generator provided for and associated with each of the at least two signals values." Each of these AC carrier signal generators may be connected "to the output line when the digital signal adopts the respective signal value." A single portion of a carrier wave, i.e., 1/4095 of a carrier wave, generated by the divider 18 is not itself an AC carrier signal generator. Miki discloses only one carrier signal generator 17, and claim 14 requires at least two.

Nor does Miki disclose dependent claim 18 "wherein the quantifier is configured to generate the digital signal values to connect or disconnect the AC carrier signals at times when the AC carrier signals have a magnitude at or near zero." As a result of timing the switching at or near zero magnitude, switching transients are dramatically reduced or eliminated. This is not achievable in Miki where the carrier voltage C is divided into separate portions and those separate portions are not switched at or near a zero crossing.

For the reasons set forth above, Applicants respectfully submit that the present application is now in condition for allowance. An early notice to that effect is earnestly solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: ______________________
John R. Lastova
Reg. No. 33,149

JRL:at
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100